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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/692,527	10/18/2000	Timothy Weidman	003984/DD/LOW K	7896

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APPLIED MATERIALS, INC.
2881 SCOTT BLVD. M/S 2061
SANTA CLARA, CA 95050

EXAMINER	
NOVACEK, CHRISTY L	

ART UNIT	PAPER NUMBER
2822	

DATE MAILED: 08/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

AK

Office Action Summary	Application No.	Applicant(s)
	09/692,527	WEIDMAN ET AL.
	Examiner	Art Unit
	Christy L. Novacek	2822

-- The MAILING DATE of this communication appears on the cov r sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 18 October 2000.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-38 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-38 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 18 October 2000 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

This Office Action is in response to the communication filed November 18, 2000.

Drawings

Figures 1 and 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid **abandonment** of the application. The objection to the drawings will not be held in abeyance.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 3 recites the limitation of the amorphous silicon carbide capping layer having a dielectric constant of less than 3.5. However, the specification continually refers to the amorphous silicon carbide capping layer as having a dielectric constant of "approximately 4.5" (pg. 5, ln. 2; pg. 10, ln. 31-32; pg. 17, ln. 20-21; pg. 18, ln. 9; Abstract, ln. 17).

Claim 10 recites the limitation of the ELK film having a dielectric constant of "approximately 3.0 or less". However, the specification defines an ELK ("extremely low dielectric constant) film as a dielectric film that has a dielectric constant of less than 2.5, while "low dielectric constant materials" are films that have a dielectric constant between 2.5 and 3.0.

Claims 15, 22 and 37 recite the limitation of depositing the capping layers at a temperature of 100-450°C. However, the specification only provides support for depositing the

a-SiC layer at a temperature of 350-450°C and the carbon-doped oxide layer at a temperature of 300-450°C (pg. 13, Table; pg. 15, ln. 6 and 24-25).

Claim 34 recites the limitation of the a-SiC layer having an etch selectivity of 40:1 to 1:1. The specification does not disclose the etch selectivity of a-SiC to any other material.

Appropriate correction is required.

The disclosure is objected to because of the following informalities:

Line 9 of page 13 recites, "dimethylsilane ($(CH_3)_2SiH_3$)". This appears to be a typographical error. The chemical formula of dimethylsilane is $(CH_3)_2SiH_2$.

Line 10 of page 13 recites, "trimethylsilane ($(CH_3)_3SiH_3$)". This appears to be a typographical error. The chemical formula of trimethylsilane is $(CH_3)_3SiH$.

Appropriate correction is required.

Claim Objections

Claim 3 is objected to because of the following informalities: Claim 3 recites the limitation of "said amorphous, hydrogenated silicon carbide capping layer". This limitation lacks antecedent basis. Claim 1, upon which claim 3 depends, does not recite the a-SiC layer to be hydrogenated. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 3, 10, 11, 13, 15, 22, 34 and 37 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 3 recites the limitation of the amorphous silicon carbide capping layer having a dielectric constant of less than 3.5. However, the specification continually refers to the amorphous silicon carbide capping layer as having a dielectric constant of "approximately 4.5" (pg. 5, ln. 2; pg. 10, ln. 31-32; pg. 17, ln. 20-21; pg. 18, ln. 9; Abstract, ln. 17).

Claim 10 recites the limitation of the ELK film having a dielectric constant of "approximately 3.0 or less". However, the specification defines an ELK ("extremely low dielectric constant) film as a dielectric film that has a dielectric constant of less than 2.5, while "low dielectric constant materials" are films that have a dielectric constant between 2.5 and 3.0. Claim 11 is rejected for being dependent upon claim 10.

Claim 13 recites the limitation of the silicon carbide layer being formed by a silane-comprising precursor. However, the specification does not disclose using silane (SiH_4) to deposit the silicon carbide layer. Instead, the specification discloses using organosilane precursors, which are silane-based compounds, but do not actually contain the silane (SiH_4) molecule (pg. 13, ln. 4-21).

Claims 15, 22 and 37 recite the limitation of depositing the capping layers at a temperature of 100-450°C. However, the specification only provides support for depositing the a-SiC layer at a temperature of 350-450°C and the carbon-doped oxide layer at a temperature of 300-450°C (pg. 13, Table; pg. 15, ln. 6 and 24-25).

Claim 34 recites the limitation of the a-SiC layer having an etch selectivity of 40:1 to 1:1. The specification does not disclose the etch selectivity of a-SiC to any other material.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-22, 34 and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation of "using a silicon carbide type film". It is not clear what the metes and bounds of this limitation are. Specifically, it is not understood what compounds are included or excluded by the phrase "silicon carbide type". Does this include any compound having a Si-C bond?

Claim 2 recites the limitation of having a stack consisting of the ELK and a-SiC layers having a dielectric constant lower than that of "another stack consisting of said ELK film and a carbon-doped silicon oxide capping layer". It is not understood where this "another stack" came from or where it exists. Is it on the same substrate as the ELK film that is covered with the a-SiC layer or is it on another substrate? Neither claim 2 nor claim 1, upon which claim 2 depends, discloses forming a carbon-doped oxide layer on an ELK film.

Claim 22 recites the limitation of forming a silicon carbide layer by providing oxygen process gas at a rate of "0-400 sccm" (line 7) while also providing the carbon-containing precursor at a rate "approximately six times that of the oxygen". This means that in the event that no oxygen gas is supplied to the process (0 sccm), then no carbon gas will be supplied either

(6 x 0 sccm). A silicon carbide film cannot possibly be formed if no carbon-containing source is provided.

Claim 34 recites that the a-SiC layer "comprises an etch selectivity ratio of between about 40 to 1 and about 1 to 1". However, the claim does not disclose what material this etch selectivity is with respect to.

Claim 37 recites the limitation of forming a carbon-doped oxide layer by providing oxygen process gas at a rate of "0-400 sccm" (line 3) while also providing the silicon and carbon containing precursors at a rate "approximately six times that of the oxygen" (lines 5-6). This means that in the event that no oxygen gas is supplied to the process (0 sccm), then no carbon gas (or silicon) will be supplied either (6 x 0 sccm). A carbon-doped oxide film cannot possibly be formed if no carbon-containing source is provided.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 10, 11, 17-19, 23, 26-29, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Annapragada et al. in view of Forbes et al.

Regarding claims 1, 17, 23, and 27, Annapragada discloses forming an extremely low dielectric constant (ELK) film (22) on a substrate (20). The ELK film is used as an interconnect insulating layer, wherein vias (23) are etched into the ELK film using photolithography and

conductive interconnect material is deposited into the vias (Fig. 1A-1F; col. 6, ln. 6-col. 7, ln. 30). Annapragada does not disclose forming an amorphous silicon carbide capping layer on the ELK film. Forbes discloses a photolithography process wherein an antireflective coating is deposited between the layer to be etched and the photoresist mask layer. The antireflective coating (ARC) comprises a bottom layer of amorphous silicon carbide (105) and an upper layer of silicon oxycarbide (110) (col. 8, ln. 46-col. 9, ln. 60). Forbes discloses that this antireflective coating is extremely useful in preventing light from the photolithography process from reaching the underlying material, whereby the resolution of the photolithography process is greatly improved, resulting in higher density circuits being able to be formed (col. 3, ln. 26-50). Forbes states that this ARC layer is appropriate to use in the formation of interconnection layers wherein underlying metal is usually highly reflective (col. 3, ln. 40-47). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the ARC film of Forbes when conducting the photolithography process of etching the ELK layer of Annapragada because Forbes teaches that the ARC layer advantageously improves the quality of a photolithography process, thereby allowing higher density devices to be formed. Furthermore, Annapragada states that the material underlying the photoresist includes metal (124) and Forbes discloses that the ARC is especially useful when underlying materials include metal, which is usually highly reflective.

Regarding claims 10 and 11, Annapragada states that the ELK film may have a dielectric constant of less than 2.5 (col. 6, ln. 6-17).

Regarding claim 18, Forbes discloses that the silicon oxycarbide may be deposited using a process in which a silicon-containing precursor (silane), a carbon-containing precursor

(methane) and an oxygen-containing process gas (oxygen or nitrous oxide) are reacted in the presence of a plasma (col. 10, ln. 8-20).

Regarding claim 26, Forbes discloses using silane and methane to form the amorphous silicon carbide and does not disclose using any oxygen (col. 9, ln. 16-42).

Regarding claims 19, 28, 29 and 38, Forbes discloses that the silicon oxycarbide layer is graded in a horizontal direction such that it comprises SiC (thus comprising 50 atomic % carbon) in its bottom portion and SiO_2 (oxygen thus comprising 66 atomic % oxygen) at its upper portion, thus the content of carbon in the layer will be graded from around 50 atomic % to 0 atomic % while the oxygen in the layer is graded from 0 atomic % to 66 atomic % (col. 10, ln. 21-40). This means that at some point during the deposition of the layer, the plasma will be oxygen starved (as oxygen flow is gradually increased from 0 sccm).

Claims 4-9, 30, 35, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Annapragada et al. in view of Forbes et al. as applied to claims 1 and 23 above, and further in view of Xu et al.

Regarding claim 4, Forbes discloses that a number of various methods may be used to deposit the silicon carbide layer, including a method of plasma-assisted chemical vapor deposition using precursors of silane and methane (col. 9, ln. 17-27). Xu discloses a method of forming an amorphous hydrogenated silicon carbide layer (BLOk) that may serve as a capping layer or an etch stop layer on interlayer dielectric materials. Xu states that this BLOk layer is better than conventional silicon carbide deposited using silane and methane because the BLOk layer has a lower dielectric constant, lower leakage current, higher breakdown strength and is easier to etch than the conventionally deposited SiC (col. 2, pg. 109). Xu states that the BLOk

layer is copper diffusion resistant (col. 1, pg. 109). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the methods disclosed by Xu et al. to deposit the silicon carbide layer of Forbes because Xu et al. teach that by depositing a silicon carbide layer according to their process, the layer advantageously has a lower dielectric constant, lower leakage current, higher breakdown strength, and is easier to etch than conventional SiC that is deposited using silane and methane.

Regarding claims 5, 6, 7, 35, and 36, Xu does not disclose the BLOk silicon carbide layer to have the limitations recited in these claims. However, Applicant's specification (pg. 10, ln. 19-21) recites that the silicon carbide capping layer of their invention may be BLOk material. Therefore, it appears as though the BLOk layer of Xu will inherently possess these claimed properties. See *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 229 (CCPA 1971) "where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristics relied on "); and *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980) (a case indicating that the burden of proof can be shifted to the applicant to show that the subject matter of the prior art does not possess the characteristic relied on whether the rejection is based on inherency under 35 U.S.C. 102 or obviousness under 35 U.S.C. 103).

Regarding claim 30, Xu discloses that the BLOk layer has a dielectric constant of less than or equal to 5 (Table 1, pg. 110).

Regarding claims 8 and 9, Xu discloses that when an interlayer dielectric film having a dielectric constant of 2.7 has a layer of BLOk silicon carbide thereon, a combined dielectric constant for a low k interlayer dielectric film and the BLOk silicon carbide capping layer is 3 (col. 2, pg. 111). In the invention of Annapragada, the interlayer dielectric film is disclosed to have a dielectric constant which may be as low as 1.2 (col. 6, ln. 6-9). At the time of the invention, it would have been obvious to one of ordinary skill in the art that the BLOk layer deposited on the interlayer dielectric film of Annapragada having a dielectric constant of 1.2 will have a combined dielectric constant of much less than 3 because Xu discloses that the combined dielectric constant of a BLOk layer and an interlayer dielectric film having a dielectric constant of 2.7 will be 3.

Claims 12, 14-16, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Annapragada et al. in view of Forbes et al. as applied to claim 23 above, and further in view of Loboda et al. ("Plasma-enhanced chemical vapor deposition of a-SiC:H films from organosilane precursors").

Regarding claims 12, 14, 16, 24, and 25, Forbes discloses an amorphous silicon carbide film that is formed without oxygen, but does not specifically disclose that the film is hydrogenated (col. 9, ln. 16-42). Forbes' amorphous silicon carbide film is formed by plasma CVD using silane and methane precursors. Loboda discloses a process of forming an amorphous, hydrogenated silicon carbide film for use in semiconductor devices wherein the film is deposited in a plasma CVD process which uses organosilicon precursor gas. Loboda states that it is advantageous to deposit the silicon carbide using an organosilicon precursor instead of silane and methane precursors because organosilicon precursors are much less hazardous than

silane, and also because the organosilicon precursor produces a silicon carbide film that has improved purity and process control since the number of process variables are reduced when a single precursor is used (pg. 90). Loboda does not disclose that the source gas for the process contains any oxygen. At the time of the invention, it would have been obvious to one of ordinary skill in the art to deposit the amorphous silicon carbide layer of Forbes using the method of Loboda because Loboda teaches that using an organosilicon precursor instead of silane and methane precursors is advantageous because organosilicon precursors are much less hazardous than silane, and also because the organosilicon precursor produces a silicon carbide film that has improved purity and process control since the number of process variables are reduced when a single precursor is used.

Regarding claim 15, Loboda discloses that the silicon carbide deposition is carried out at a temperature of 250°C (Table I, pg. 91).

Claims 20, 21 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Annapragada et al. in view of Forbes et al. as applied to claims 18 and 23 above, and further in view of Loboda et al. ("Deposition of Low-k Dielectric Films Using Trimethylsilane").

Regarding claims 20 and 31, as stated above in reference to claim 18, Forbes discloses that the silicon oxycarbide may be deposited using a process in which a silicon-containing precursor (silane), a carbon-containing precursor (methane) and an oxygen-containing process gas (oxygen or nitrous oxide) are reacted in the presence of a plasma (col. 10, ln. 8-20). Forbes does not disclose that the silicon-containing precursor and the carbon-containing precursor can be derived from a common organosilane precursor. Loboda discloses a process for making a silicon oxycarbide for use as a dielectric film of a semiconductor device by utilizing an

organosilane precursor as a silicon and carbon source and using N_2O as an oxygen source (pg. 145). The silicon oxycarbide produced using the organosilane precursor has a dielectric constant of less than 3.0 (Abstract). Loboda states that it is preferable to form a carbon-doped silicon oxide layer using an organosilane precursor (trimethylsilane) for the silicon and carbon sources instead of using a silane precursor because the trimethylsilane precursor is less dangerous to handle than silane (pg. 145; pg. 152). Loboda also asserts that the silicon oxycarbide produced by using the trimethylsilane precursor produces a low permittivity, low stress, high thermal stability film, which is compatible with the requirements needed for the fabrication of the high performance interconnect structures needed for increased processing speed in modern IC designs (pg. 152). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use a trimethylsilane precursor to form the silicon oxycarbide layer of Forbes because Forbes teaches using a silane precursor and Loboda teaches that a trimethylsilane precursor is preferable to a silane precursor because the trimethylsilane precursor is not dangerous to handle and the trimethylsilane can produce a film that has low permittivity, low stress, and high thermal stability.

Regarding claim 21, Forbes discloses that the silicon oxycarbide layer is graded in a horizontal direction such that it comprises SiC (thus comprising 50 atomic % carbon) in its bottom portion and SiO_2 (oxygen thus comprising 66 atomic % oxygen) at its upper portion, thus the content of carbon in the layer will be graded from around 50 atomic % to 0 atomic % while the oxygen in the layer is graded from 0 atomic % to 66 atomic % (col. 10, ln. 21-40). This means that at some point during the deposition of the layer, the organosilane precursor which

supplies the silicon and carbon will be at a value of approximately six times the flow of oxygen gas (as oxygen flow is gradually increased from 0 sccm).

Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Annapragada et al. in view of Forbes et al. as applied to claim 23 above, and further in view of Xu et al. and Loboda et al. ("Deposition of Low-k Dielectric Films Using Trimethylsilane").

Regarding claim 32, Forbes discloses that a number of various methods may be used to deposit the silicon carbide layer, including a method of plasma-assisted chemical vapor deposition using precursors of silane and methane (col. 9, ln. 17-27). Xu discloses a method of forming an amorphous hydrogenated silicon carbide layer (BLOk) that may serve as a capping layer or an etch stop layer on interlayer dielectric materials. Xu states that this BLOk layer is better than conventional silicon carbide deposited using silane and methane because the BLOk layer has a lower dielectric constant, lower leakage current, higher breakdown strength and is easier to etch than the conventionally deposited SiC (col. 2, pg. 109). Xu states that the BLOk layer is copper diffusion resistant (col. 1, pg. 109). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the methods disclosed by Xu et al. to deposit the silicon carbide layer of Forbes because Xu et al. teach that by depositing a silicon carbide layer according to their process, the layer advantageously has a lower dielectric constant, lower leakage current, higher breakdown strength, and is easier to etch than conventional SiC that is deposited using silane and methane.

For the reasons stated above in reference to claim 20, at the time of the invention, it would have been obvious to one of ordinary skill in the art to fabricate the silicon oxycarbide layer of Forbes using the trimethylsilane precursor in the manner described by Loboda.

Xu discloses that when an interlayer dielectric film having a dielectric constant of 2.7 has a layer of BLOk silicon carbide thereon, a combined dielectric constant for a low k interlayer dielectric film and the BLOk silicon carbide capping layer is 3 (col. 2, pg. 111). In the invention of Annapragada, the interlayer dielectric film is disclosed to have a dielectric constant which may be as low as 1.2 (col. 6, ln. 6-9). Loboda discloses that the dielectric constant of the silicon oxycarbide produced using the trimethylsilane precursor may have a dielectric constant as low as 2.6 (Table 2). Because the ELK film of Annapragada has a k of 1.2, the a-SiC:H film of Xu has a k of 3.6, and the silicon oxycarbide layer of Loboda has a k of 2.6, it appears that the stack of these films will inherently possess the claimed dielectric constant of "approximately less than 2.5". See *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 229 (CCPA 1971) "where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristics relied on "); and *In re Fitzgerald*, 619 F.2d 67, 205 USPQ 594 (CCPA 1980) (a case indicating that the burden of proof can be shifted to the applicant to show that the subject matter of the prior art does not possess the characteristic relied on whether the rejection is based on inherency under 35 U.S.C. 102 or obviousness under 35 U.S.C. 103).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (703) 308-5840. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

CLN
August 1, 2002

Carl Whitehead Jr.
CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800